



AS-MADE

Assessment of Marine Debris on the Belgian Continental Shelf: occurrence and effects

DURATION OF THE PROJECT
01/07/2009 – 30/06/2011

BUDGET
179.619 €

CONTEXT

Worldwide there are concerns about the occurrence and potential adverse effects of marine debris. This debris is not only aesthetically displeasing, but can also be a nuisance to boaters and the shipping industry, and can negatively impact marine biota. Reported effects on marine organisms include entanglement in nets, fishing lines and ropes, and ingestion. Beach visitors can be harmed by broken glass, medical waste, fishing line and discarded syringes.

However, there is a lack of information on the origin, quantity and type of debris present in the different marine compartments. Additionally, recent studies have reported on the wide-spread presence of small plastic fragments (microplastics) in the pelagic and benthic zones of marine systems. For all these types of debris there is no to very little data available for the Belgian Continental Shelf area.

PROJECT DESCRIPTION

Objectives

The main objectives of the AS-MADE project are:

- (1) Development of an integrated database with both existing and newly gathered data on the presence of marine debris in the various marine compartments.
- (2) Providing detailed data on the occurrence and distribution of marine debris – including microplastics – in the Belgian marine environment.
- (3) Through simultaneous monitoring of macro- and microplastics in different compartments of the marine ecosystem and the study of the effects of both types of litter on marine organisms, offer a complete picture of the environmental risks of marine debris.

Methodology

The proposed project can be divided into five different research phases:

Phase I: Integrated database development

Existing data on beach litter in the Belgian coastal zone will be gathered and integrated into one database, so that all available information on this subject can be easily analysed and accessed by various stake-holders.

Phase II: Monitoring and validation of the integrated database

Dedicated monitoring campaigns will be carried out, which will give a complete picture of the prevalence of debris (including micro-plastics) in the various compartments of the Belgian marine environment. The data resulting from these campaigns, will be used to validate (and put into perspective) the database developed under Phase I. At the end of the project, the newly acquired data will be integrated into this database.

Phase III: Impact/effect assessment

(1) 'Micro'-plastics: the possible effects of small plastic fragments on marine, aquatic species will be evaluated in laboratory experiments in which model invertebrate species will be exposed to realistic concentrations of microplastics (collected in the monitoring studies – cf. Task 2). The concentrations of micro-contaminants associated with these plastic items will be quantified in a selected number of samples. Parallel tissue analyses of the model test species will allow assessment of the potential contaminant bio-transfer.

(2) 'Macro'-debris: the impact of larger items on marine wildlife will be assessed using existing, unprocessed data sets concerning the in situ effects on seabirds.

Phase IV: Financial impact assessment

The task will - based on existing information and/or a limited questionnaire survey on the (financial) effort made by coastal municipalities to remove beach litter – assess the cost and need (frequency) of debris removal. The costs of beach cleaning will be compared to the environmental impact of marine debris, the costs and advantages of prevention will also be studied.

Phase V: Dissemination and development of science-based policy evaluation tools

The results obtained in research Phases 1 through 4 will be made available through a user-friendly website and database. Based on an in-depth analysis of these results, guidelines and/or tools will be proposed on how to assess marine debris occurrence and effects. Moreover, guidelines on how to (cost-)efficiently address the issue of marine debris removal/prevention in an attempt to reduce impact on the marine environment, will be put forward.



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INTERACTION BETWEEN THE DIFFERENT PARTNERS

UG-LMAE is responsible for the general coordination and will be the central link between the project and the outside world.

VLIZ-ICZM will develop the integrated database. The sampling campaigns will be organized by VLIZ, who will provide cruise time on the available research vessels. All partners will collaborate for the execution of the campaigns.

UG-LMAE will conduct the experimental part considering the effect assessment of microplastics (including the associated micropollutants);

INBO will analyse the existing datasets on the effects of macro-debris on seabirds.

UG-LMAE and **VLIZ-ICZM** will cooperate to make the initial contacts to conduct the questionnaire surveys on financial efforts/impacts associated with marine debris.

VLIZ-ICZM will be responsible for the further follow-up. All collected data will be transferred to VLIZ, who will be responsible for reporting the data to IDOD.

EXPECTED RESULTS AND/OR PRODUCTS

The AS-MADE project will provide detailed information on the occurrence and distribution of both macro- and microdebris in the Belgian marine environment, as well as data on the effects of both types of debris on marine organisms. The combination of both datasets will allow a detailed analysis of the risks the marine debris poses for our marine environment. Data on concentrations of important micropollutants that have potentially accumulated in (micro)plastics, will become available. Laboratory experiments will establish whether biotransfer of these absorbed pollutants from ingested plastic particles to marine organisms is possible.

PARTNERS

Activities

Laboratory of Environmental Toxicology and Aquatic Ecology (UG-LMAE)

Research themes of this group focus on fundamental and applied aspects of aquatic toxicology and ecological risk assessment. In 2007, they conducted the first research on the occurrence of microplastics in the Belgian coastal zone.

Flanders Marine Institute (VLIZ) and Coordination Centre for Integrated Coastal Zone Management (ICZM)

VLIZ functions as data and information centre with rapid and open access to high quality data and information from a wide range of marine sciences. ICZM conducts an annual clean-up action on Belgian beaches since 2004.

Research Institute for Nature and Forest (INBO)

INBO is a Flemish research institute and knowledge centre for nature and its sustainable management and use. They for instance monitor the condition of the tern population in Zeebrugge, and since 2006 they have been conducting an annual beached bird survey.

CONTACT INFORMATION

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Follow-up Committee

For the complete and most up-to-date composition of the Follow-up Committee, please consult our Federal Research Actions Database (FEDRA) by visiting <http://www.belspo.be/fedra> or <http://www.belspo.be/ssd>

